

TransGuide

Model Deployment Initiative

Design Report

NOTE TO READER:

THIS IS A LARGE DOCUMENT

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TransGuide

Model Deployment Initiative

Design Report

Model Deployment Partners:
Texas Department of Transportation
City of San Antonio
VIA Metropolitan Transit

Report by:
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TRANSGUIDE
TECHNOLOGY IN MOTION

Foreword



To support the deployment of Intelligent Transportation Systems (ITS) using federal, state, and local funding, the U.S. Department of Transportation initiated the Model Deployment Program in 1996. The metropolitan area Model Deployment Initiatives (MDIs) were intended to demonstrate integrated transportation management systems. The MDIs feature a strong, regional, multimodal traveler information services component. These model deployments showcased the benefits of having an integrated, region-wide approach to managing transportation and providing traveler information services. The model deployments bring increased levels of service to the traveling public through the integration of several key systems: traffic signal control; transit, freeway, and incident management; emergency services management; regional, multimodal traveler information services; and electronic toll collection and fare payment. In addition to introducing the public to the benefits of ITS products and services, the sites serve as showcases for local decision makers across the United States. Tours of the sites and seminars focus on the benefits of ITS investment by both the public and private sectors. The model deployment sites also permit rigorous evaluations of the benefits of integrating intelligent transportation infrastructure in a metropolitan area.

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TransGuide™, the Advanced Traffic Management System (ATMS) in San Antonio, Texas, is in its third year of operation. The Texas Department of Transportation ATMS uses cameras, fiber optics, and electronic message signs to detect, communicate, and notify drivers of incidents along the highway. In July 1995, TransGuide became operational along 26 miles of highway in central San Antonio. When TransGuide is completed, the \$151 million system will cover 191 miles of

highway in San Antonio. Partners in this massive effort include the Texas Department of Transportation, the City of San Antonio (police, fire, emergency medical service, and public works) and VIA Metropolitan Transit.

Southwest Research Institute served as the prime contractor for the \$13.5 million TransGuide MDI. Programs implemented as part of the MDI include:

- **Data Server:** The Data Server is the central archive of travel information encompassing 600 miles of freeways and arterials in the San Antonio metropolitan area. These data are collected from TransGuide traffic data, traffic accident reports, lane closures, and automated vehicle identification data.
- **Automated Vehicle Identification:** The Automated Vehicle Identification (AVI) sensors detect vehicles that are equipped with AVI tags. The sensors transmit the data to the TransGuide Operations Center, where travel times and speeds are computed for the instrumented roadways.
- **Railroad Grade Crossing System:** The Advanced Warning for Railroad Delays (AWARD) System is designed to help motorists avoid delays caused by railroad operations that cross freeway access or frontage roads. The AWARD System, which monitors four grade crossings using six

sensors, alerts drivers to potential delays near freeway exits and entrances.

- **Traveler Information Kiosks:** Kiosks provide current traffic conditions, motorist services, transit and airport information, key areas of interest in the region, weather maps, and other data from touch-screen monitors. Forty Kiosks are deployed as part of the program.
- **In-Vehicle Navigation System:** This system provides drivers with real-time traffic congestion and incident information, vehicle location, and information on regional points of interest. As part of the program, 590 units were distributed to local transportation agencies, law enforcement agencies, emergency response organizations, and various government organizations.
- **Emergency Medical Services Management System (LifeLink™):** This system permits two-way video teleconferencing between emergency medical personnel in a hospital and paramedics in an ambulance en route to the hospital. Additionally, the system transfers vital statistics data from the ambulance to the hospital.

This report documents the high-level design of the TransGuide MDI project and discusses the design trade-off decisions. A detailed, specific project level design is provided in each project's System Design document.

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Acronyms

A/V	Audio/Visual
ADP	Automatic Data Processing
API	Application Programming Interface
ATIS	Advanced Traveler Information System
ATMS	Advanced Traffic Management System
AVI	Automated Vehicle Identification
bps	Bits Per Second
CCD	Charge Coupled Device
CD	Compact Disc
CD-ROM	Compact Disk-Read Only Memory
COTS	Commercial Off-the-Shelf
CPU	Central Processing Unit
DGPS	Differential Global Positioning System
DS	Model Deployment Initiative Data Server
EMS	Emergency Medical Service
ESRI	Environmental Systems Research Institute
FCC	Federal Communications Commission
FHWA	Federal Highway Administration
FM	Frequency Modulation
FM STIC	FM Subcarrier Traffic Information Channel
GIS	Geographical Information System
GPS	Global Positioning System
GUI	Graphical User Interface
ISDN	Integrated Services Digital Network
ITS	Intelligent Transportation Systems
IVN	In-Vehicle Navigation
IVRT	Intelligent Vehicle Registration Tag
K	1024
LAN	Local Area Network
LCD	Liquid Crystal Display
LCS	Lane-Control Signal
LIDAR	Laser Radar
MB	Megabyte
Mbps	Million Bits per Second
MC	Master Computer
MDI	Model Deployment Initiative
MHz	Megahertz
NavTech	Navigation Technologies
NIC	Network Interface Card
NTSC	National Television Standards Committee
PC	Personal Computer
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PCMCIA	Personal Computer Memory Card International Association
POTS	Plain Old Telephone System
RAM	Random Access Memory

Acronyms (Cont'd)

RF	Radio Frequency
RFO	Request for Offer
ROM	Read Only Memory
RR	Railroad
SCSI	Small Computer System Interface
SNMP	Simple Network Management Protocol
STIC	Subcarrier Traffic Information Channel
SwRI	Southwest Research Institute
TCP/IP	Transmission Control Protocol/Internet Protocol
TOC	TransGuide Operations Center
TxDOT	Texas Department of Transportation
V	Volts
VAC	Volts Alternating Current
VDC	Volts DC
WDM	Wave Division Multiplexer
WEB	Wireless Ethernet Bridge
WWW	World Wide Web